

REMARKS

The Office Action mailed August 26, 2003 has been reviewed and carefully considered. Claims 10 and 20 have been amended and claim 13 has been canceled. No new matter has been added. Claims 10-12, 14-21 remain pending in this application, with claim 10 being the only independent claim. Reconsideration of the above-identified application, as amended, and in view of the following remarks is respectfully requested.

On a preliminary note, applicants filed a Supplemental Information Disclosure Statement on July 16, 2003. The Examiner indicated that the Information Disclosure Statement (PTO-1449) would be attached as paper 8. No such paper was attached. Accordingly, applicants respectfully requests that a copy of the PTO Form 1449, initialed by the Examiner is enclosed with the next communication.

In the outstanding Office Action the Examiner rejected claims 10-21 under 35 U.S.C. 103(a) as being unpatentable over Sugawara (US Patent 4,203,799) in view of Case (US Patent 4,555,767).

Before applicants discuss the prior art, a brief summary of the invention is appropriate. Applicants have invented a method for measuring the absolute wafer process temperature and composition of a multi-layer material, such as in a semi-conductor layer system, during epitaxy under constant processing conditions. For doing so, the wafer is illuminated with an illuminating energy, its reflectivity is measured over time and, and from this, the position of an extreme value of the Fabry-Perot oscillations of the wafer is determined.

Applicants respectfully point out that the Sugawara reference only refer to measuring of the thickness of a layer or measuring of the growth rate. The present invention relates to the determination of the absolute wafer process temperature and composition of the layers. Applicants have amended independent claim 10 to more definitely claim a method for the measuring of the absolute wafer process temperature and composition of the layers.

Applicants submit that the determination of the process temperature and the composition of the layers are new. Foremost, the exact determination of the process temperature leads to an interdependence between refraction index n and composition of the layers x . The refraction index n relates in its original interdependence to two parameters (process temperature T and

composition of the layers x). Therefore only the exact determination of the process temperature T leads to the possibility to derive the composition of the layers x directly from the measured reflection signal R/R_{GaAs} .

The Sugawara reference discloses that in growing on a substrate a film of substance of a similar kind to the substrate, ions are implanted into the substrate to form within the substrate a layer of substance having an optical property different from that of the substrate, and an epitaxial film is then grown. Thereby, the thickness of the film can be monitored with an interference waveform appearing with its growth. Accordingly, the Sugawara reference does not provides determination the absolute wafer process temperature and compositions of the layers, as applicants claim.

The secondary reference, Case, provides a method for measure the thickness of an epi layer grown on a substrate. In doing so, case directs IR energy onto an epi layer and a portion of the energy is reflected from the surface of the epi layer and from the interface of the epi layer and substrate. The spectral reflectance of the reflected energy is measured by means of a Fourier transform IR spectrometer . The measured values of spectral reflectance are correlated with a series of theoretical reflectance values determined for different thicknesses of an epi layer in a range including the nominal thickness. The measured or actual epi thickness is determined from the correlation analysis.

Accordingly, the secondary reference of Case can not cure the deficiencies of the Sugawara reference. In addition, there is no suggestion in the Sugawara reference stating that if combined in the manner proposed by the Examiner, one can determine the absolute wafer process temperature and the composition thereof. Absent such suggestion, there would be no reason why one skilled in the art, would consult the particular combination of references suggested by the Examiner. The references show no recognition of, or pertinence to such problem as presently claimed, and that therefore one skilled in the art would not be likely to use such reference, alone or in combination with another reference; in an attempt to solve such problem.

For the foregoing reasons applicants submit that independent claim 10 is patentable over the art of record. Claims 11-21 directly or indirectly depend from independent claim 10 and thus are

patentable for the same reasons that claim 10 is patentable. Applicants submit that the application is now in condition for allowance and passage to issuance is requested.

If any additional fees or charges are required at this time in connection with the application, authorization is hereby given to charge our Patent and Trademark Office Deposit Account No. 14-1263.

Respectfully submitted,



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